



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,600	10/12/2001	Wolf-Dietrich Weber	02998.P018	2730

7590 08/11/2005

Maria McCormack Sobrino  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP  
Seventh Floor  
12400 Wilshire Boulevard  
Los Angeles, CA 90025-1026

EXAMINER
----------

CHACE, CHRISTIAN

ART UNIT	PAPER NUMBER
----------	--------------

2189

DATE MAILED: 08/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/977,600

Applicant(s)

WEBER, WOLF-DIETRICH

Examiner

Christian P. Chace

Art Unit

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7 July 2005 has been entered.

### ***Response to Amendment***

Amendment filed 7 July 2005 has been entered. Claims 1-3 and 5-21 are pending. Applicants' arguments have been carefully and respectfully considered, but they are not persuasive. However, as this is a first action on merit following a RCE, and the claims have been amended, this action is NOT final.

### ***Claim Objections***

Claim 3 is objected to because of the following informalities: The claim recites the phrase, "dynamically configurable adjustable by software." This phrase is awkward and unclear. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 19-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. These claims could not be treated with respect to prior art as they are vague and indefinite and cannot be searched as such.

With respect to claims 19 and 20, the claim recites, "filter logic." This appears to be shown in the disclosure in figure 7. However, the claims go on to recite "combining" scheduling options. This appears to be shown as a combiner in figure 3, for example. Accordingly, it is unclear which element performs which functions. Applicants are also informed that the limitation, "based on achieving a highest usage efficiency of the volatile memory while still satisfying quality of service guarantees for each thread" is an "intended use" limitation, and therefore, has been given no patentable weight, as it does not further limit the scope of the claim, but merely recite an intended result.

With respect to claim 21, the "means for" language of the claim invokes interpretation under 35 USC 112, 6<sup>th</sup> paragraph. This requires one to look to the specification for the relevant structure and its equivalents. However, a view to the specification leads to indefiniteness in this case. For example, looking to the specification for the "means for tracking a current state of the device," examiner finds "tracking" language in several areas. Some include, from the respective figures and their discussions, "#35, #340, #345, #505, #715, #820, and #830, e.g. Accordingly, as it cannot be ascertained which elements perform the claimed functions, the scope of the claim cannot be determined and is indefinite.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 2189

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5-14, and 17-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Strongin et al (US Patent #6,510,497).

With respect to independent claim 1, a method for scheduling access to a device is disclosed in the title.

Tracking a current state of the device is disclosed in column 11, lines 45-50. This is also disclosed in column 18, lines 22-35 as “determining a status.”

Tracking a count of a number of requests which require a “particular” state is disclosed in column 11, lines 55-60, as the number of requests issued and/or amount of time elapsed. Both “particular states” would inherently require a count of some sort. A count is one or more, and the particular state is the bus direction, as is further explained in column 18, lines 22-35.

Scheduling requests to a device using the current state of the device, the count of the number of requests that have already been scheduled using the current state, a threshold value established for a switch point (number of pending operations) indicating when to switch state, wherein after the count reaches the switch point and there are incoming requests having an alternate state to the current state (a different bus direction or a different open bank of DRAM) of the device, switching the state of the device to process incoming requests is disclosed in column 12, lines 20-35. Also see column 18,

lines 22-35, which discusses scheduling a number of “tracked” requests based on the bus direction, or “device state.” The “switch point” is when the pending requests consistent with the memory bus direction are issued, and the bus direction reverses, or switches, to allow the scheduled requests that were previously inconsistent with the previous bus direction to now issue. However many requests there are, in a certain bus direction (read or write), in the queue, is the threshold.

With respect to claims 2 and 7, “configuring” the switch point is disclosed in column 12, lines 22-33, which is the number of pending requests. As this number changes, the switch point is “re-configured.”

With respect to claims 3 and 12, the switch point being adjustable by software is disclosed in column 15, lines 5-10. As discussed with respect to the independent claims upon which the instant claims depends, e.g., claim 1, the switch point is adjustable. Strongin et al clearly discuss hardware and software being interchangeable.

With respect to claims 4 and 9, the switch point being “dynamically” configurable is discussed supra with respect to claims 2 and 7. “Dynamic” simply means it changes.

With respect to claims 5 and 11, the device being a DRAM is disclosed in column 13, line 8, for example. A scheduler type being selected from the group consisting of a DRAM bus turnaround scheduling (consistent with the direction of a bus), DRAM page scheduling (targeted to one or more open pages in memory), and DRAM physical bank switching (identifying one or more closed pages, such as banks, in column 13, lines 50-67, for example) is disclosed in column 14, lines 20-60.

With respect to independent claim 6, a bus scheduler is disclosed in column 17, line 4 as an arbiter configured to arbitrate between memory requests according to a bus direction.

An input configured to receive at least one incoming request, each request indicating a bus direction is disclosed in column 18, lines 22-35, which discloses pending memory access commands, which are scheduled based on their consistency or lack thereof with the memory bus direction. Inherently, there must be an “input configured to receive” these requests for the system to operate – a computer must be told what to do.

A switch point is disclosed in column 18, lines 22-35 in that the “switch point” is when the first set of pending requests are issued and the bus direction switches to accommodate the second set of pending request that were previously inconsistent with that bus direction.

An indicator of a current bus direction is disclosed in column 18, lines 22-35 and in lines 55-60, which discusses determining the direction of the bus. Inherently, if the bus direction is determined, it is indicated.

A count of requests processed through the current bus direction is disclosed in column 18, lines 22-35 as the “one or more” pending access requests. “One or more” indicates a number, which is a count.

Logic configured to switch the direction of the bus to process incoming requests wherein after the count reaches the switch point and there are incoming requests having the direction opposite to the current direction of the device bus, switching the

direction of the device bus is disclosed in column 18, lines 22-35, which discloses issuing the requests consistent with a bus direction ahead of, or before, the requests inconsistent with the bus direction. (The logic for implementing this method is disclosed in column 17 and 18 in claims 1-12, for example).

With respect to independent claim 8, a scheduler is disclosed as a memory arbiter in column 17, line 4.

A switch point is disclosed as discussed supra with respect to claims 1 and 6.

A current device state is disclosed as a bus direction and/or a page status in column 18, lines 22-35.

A count is disclosed as "one or more" in column 18, line 30.

Logic configured to determine an updated device state using the switch point and count such that when the count crosses a threshold of the switch point, the device state is changed is disclosed in column 18, lines 22-35, where memory accesses are scheduled based on the bus direction and the page status.

Scheduling the access requests to the device using the updated device state is disclosed in column 18, lines 22-35, which discloses that after the pending requests that are consistent with the device state are issued, the access requests are then issued ("ahead of") that are inconsistent with the previous device state.

With respect to claim 10, the device comprising a bus and the device state comprising a bus direction, said scheduling being dependent upon the bus direction is disclosed in column 11, lines 64-65.



With respect to claim 13, the device comprising a DRAM with multiple pages and the device state comprising the identity of at least one open page, said scheduling being dependent upon the at least one page opened is disclosed in column 11, lines 5-10.

With respect to claim 14, the device comprising a DRAM with multiple physical banks and the device state comprising the last accessed physical bank, said scheduling dependent upon the last accessed physical bank is disclosed in column 15, lines 29-34.

With respect to claims 17-18, a system on a chip, or ASIC, is disclosed in column 14, line 60 into column 15, line 11.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strongin et al (cited supra).

With respect to claims 15-16, Strongin et al recite the subject matter of the claims upon which the instant claims depend, as discussed supra.

The difference between the explicit recitation of Strongin et al and the instant claims, is the explicit recitation of a register to store the threshold number of counts to establish a switch point.

It is extremely well known to those of even rudimentary skill in the art that a register may be employed to count requests in a buffer or queue of requests to inform

the system of how many particular requests may be present. The examiner takes OFFICIAL NOTICE of this teaching.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Strongin et al before him/her, to utilize a counter (register) to count the number of requests using a certain bus direction, so the system would know how long to keep the bus going in that certain direction so that service may be provided in the round-robin format discussed by Strongin et al in column 10, lines 27-42, e.g.

### ***Response to Arguments***

Examiner believes applicants' arguments have been addressed supra.

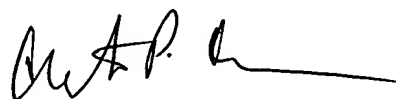
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian P. Chace whose telephone number is 571.272.4190. The examiner can normally be reached on MAXI FLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571.272.4201. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2189

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'C. P. Chace', followed by a long horizontal line.

Christian P. Chace  
Primary Examiner  
Art Unit 2189